

MATH*1160 - Linear Algebra I

Winter 2024 Course Outline

Section: 01

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

Calendar Description

This course provides an introduction to linear algebra in Euclidean space. Topics covered include: N-dimensional vectors, dot product, matrices and matrix operations, systems of linear equations and Gaussian elimination, linear independence, subspaces, basis and dimension, matrix inverse, matrix rank and determinant, eigenvalues, eigenvectors and diagonalization, orthogonalization and projections, linear transformations. Some fundamental proofs and applications of these topics will be included.

Prerequisite(s): 4U Calculus and Vectors or 4U Advanced Functions

Restriction(s): ENGG*1500

Department(s): Department of Mathematics and Statistics

Course Fit Within Program/Curriculum

This course is a prerequisite for (among others)

CHEM*3870 Molecular Spectroscopy

CIS*4020 Data Science

MATH*2270 Applied Differential Equations

MATH*3130 Abstract Algebra

MATH*3160 Linear Algebra II

MATH*3200 Real Analysis

MATH*3240 Operations Research

PHYS*3230 Quantum Mechanics I

STAT*3240 Applied Regression Analysis

STAT*4350 Applied Multivariate Statistical Methods

Lecture Schedule

TuTh 11:30am-12:50pm in ROZH*101 (1/8 to 4/23)

Instructor Information

Rajesh Pereira

Email: pereirar@uoguelph.ca

Additional Support

Mathematics and Statistics Learning Centre

Located in the Science Commons on the 3rd Floor of the McLaughlin Library, the Mathematics and Statistics Learning Centre is a drop-in centre staffed by Teaching Assistants who are there to help you with any questions you may have about any 1000-level MATH course (including MATH 1160) or 2000-level STAT course. No appointment is necessary.

Hours of Operation

Monday 9:30-3:30
Tuesday 10:00-4:00
Wednesday 9:30-3:30
Thursday 10:00-4:00
Friday 9:30-2:30

Textbooks

Group	Title	Author	ISBN
Required	WORKBOOK FOR MATH*1160	GARVIE	9780901058041
Recommended	Linear Algebra: What you Need to Know	WOERDEMAN	9781000345896 (e-book available from library)

Course Learning Outcomes

Course Level Learning Outcomes

Students who successfully complete the course will:

- 1) Have a basic understanding of the algebra of matrices.
- 2) Understand how linear algebra is needed to work with systems of linear equations.
- 3) Be familiar with some applications of linear algebra.
- 4) Have a basic understanding of some theoretical linear algebra concepts, including proof.

Midterms

The midterms and final exam will be closed book. No calculators are permitted. Both midterm exams will be one hour and held in class during class time. Midterm 1 will be on February 13th and Midterm 2 will be on March 14th. If classes are cancelled on either day due to weather etc., the midterm will be moved to the next available class.

- There will be NO MAKE-UP MIDTERM EXAMS. If you miss a Midterm exam due to serious illness of yourself or a death in your immediate family, or due to personal grounds, please contact me by email ASAP explaining the reason for missing the test. You do NOT need to get a doctor's note.
- UNDER NO CIRCUMSTANCES WILL ANY EXAM BE RE-SCHEDULED AT A DIFFERENT TIME AND/OR DATE FOR INDIVIDUAL STUDENTS, with the possible exception of exams taken in SAS.
- Athletes who compete away from the University of Guelph during a midterm exam can arrange for their coach to proctor their exam. Just get your coach to contact me, and we will make the arrangements.

Final Exam

Date: Apr 11

Time: Th 11:30am-1:30pm

Location: TBA Please see Web Advisor closer to the date of scheduled final for location.

To understand rules and regulations regarding Examinations students are encouraged to read Student's Responsibilities (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/examinations/>)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the Academic Consideration, Appeals and Petitions (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>) section of the Academic Calendar.

Grading Schemes

There are two grading schemes in this course in order to minimize the effect of poor performance on one of the Midterm tests. The scheme that will give you the highest grade will be selected automatically.

Scheme 1

Midterm Term Tests Total: 50%

- Best Midterm Test (30%)
- Worst Midterm Test (20%)

Final Exam (50%)

Scheme 2

Midterm Term Tests Total: 30%

- Best Midterm Test (30%)
- Worst Midterm Test (0%)

Final Exam (70%)

Last Day to Drop Course

The final day to drop Winter 2024 courses without academic penalty is the last day of classes: April 08

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Practice Questions

Submission of Assignments

Practice makes perfect. Practice questions will be handed out regularly in courselink and often discussed in class. While these questions will not be submitted or marked, it is highly recommended that you do them.

Standard Statements for Undergraduate Courses

Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate Calendar.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/>).

Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all undergraduate students except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigators/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (<https://wellness.uoguelph.ca/shine-this-year/>). The Student Wellness team are here to help and welcome the opportunity to connect with you.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

Recording of Materials

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information

on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)